

What is claimed is:

1. A method of searching for at least one of a service path and a service node operable to provide a requested service via a multicast tree, the method comprising:
 - receiving a request for at least one service; and
 - 5 searching stored information at a node receiving the request for at least one of a service path and a service node operable to provide the requested service.
2. The method of claim 1, wherein the stored information comprises a global information table, the global information table including at least location information and information 10 associated with services provided for nodes in a distributed hash table overlay network.
3. The method of claim 2, wherein the distributed hash table overlay network is a logical representation of a physical network including the multicast tree.
- 15 4. The method of claim 3, wherein the global information table includes information for nodes physically close in the physical network.
5. The method of claim 1, wherein searching stored information comprises:
 - searching the stored information to determine whether a service path or a service node 20 exists that is operable to provide the requested service and satisfy a QoS characteristic identified in the request, the QoS characteristic being associated with delivering the requested service.

6. The method of claim 1, wherein searching the stored information comprises:
searching the stored information to determine whether a service path exists that is
operable to provide the requested service or is operable to provide at least one of the
requested services if a plurality of services are requested.

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7. The method of claim 6, wherein searching the stored information to determine
whether a service path exists comprises:

searching the stored information to determine whether a service path exists that is
operable to provide the requested service and is within a predetermined distance to a node
10 requesting the service.

8. The method of claim 6, wherein searching the stored information comprises:
searching the stored information to identify a plurality of service nodes operable to
provide the requested service in response to a service path not existing that is operable to
15 provide the requested service.

9. The method of claim 8, further comprising:
applying a clustering algorithm to the plurality of service nodes to identify a set of
candidate service nodes from the plurality of service nodes closest to a node requesting the
20 service.

10. The method of claim 1, wherein the request comprises information identifying a
plurality of requested services and an order for delivering the requested services.

11. The method of claim 1, wherein the request comprises information identifying at least one requested service and at least one QoS characteristic associated with delivering the requested service.

5 12. The method of claim 1, wherein searching stored information comprises searching stored information for at least one of a service path and a service node operable to provide the requested service via a multicast in an application layer multicasting network.

10 13. A method of requesting a service in an application layer multicasting network, the method comprising:

generating a request for a service including at least one requested service and at least one QoS characteristic associated with delivering the at least one service; and transmitting the request to a node in a distributed hash table overlay network.

15 14. The method of claim 13, wherein transmitting the request to a node comprises: determining location information for a node generating the request; hashing at least a portion of the location information to identify a node in the distributed hash table overlay network to transmit the request; and transmitting the request to the identified node in the distributed hash table overlay
20 network.

15. The method of claim 14, wherein determining location information comprises:

determining a first distance from the node generating the request to at least one global landmark node;

determining a second distance from the node generating the request to at least one local landmark node proximally located to the node; and

5 determining location information for the node based on the first distance and the second distance.

16. The method of claim 13, wherein the overlay network includes a plurality of nodes storing information regarding location information and services provided by the plurality of
10 nodes in the multicast network, such that each node in the overlay network stores location information and services provided for nodes physically close in the multicast network.

17. The method of claim 13, further comprising:
receiving a list of a set of candidate nodes operable to satisfy the request; and
15 selecting one of the candidate nodes to construct a service path from a node transmitting the request to the selected candidate node for receiving the requested service.

18. The method of claim 17, wherein selecting one of the candidate nodes comprises:
measuring distances to each of the candidate nodes;
20 determining a metric associated with the at least one QoS characteristic; and
selecting one of the candidate nodes closest to the node requesting the service and operable to satisfy the at least one QoS characteristic.

19. A method of storing information in a node in an application layer multicast network, wherein the method comprises:

receiving location information for a plurality of nodes;

receiving information associated with services provided by the plurality of nodes; and

5 storing the location information and the information associated with services in a table, wherein the location information for the plurality of nodes comprises distances measured from each of the plurality of nodes to a plurality of global landmark nodes and to at least one local landmark node.

10 20. The method of claim 19, further wherein the at least one local landmark node is proximally located to a respective node of the plurality of nodes.

21. The method of claim 19, further comprising:

storing a QoS characteristic associated with at least one of the plurality of nodes in the
15 table.

22. The method of claim 19, further comprising:

storing at least one of a node identifier and a service path identifier for each of the plurality of nodes in the table.

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23. The method of claim 19, wherein receiving location information for a plurality of nodes comprises receiving location information for a plurality of nodes, the nodes being located physically close in the network.

24. A node in a network comprising:

means for receiving a request for at least one service, and

means for searching stored information at the node for at least one of a service path
and a service node operable to provide the requested service.

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25. The node of claim 24, wherein the stored information comprises a global information
table, the global information table including at least location information and information
associated with services provided for nodes in a distributed hash table overlay network.

10 26. The node of claim 25, wherein the distributed hash table overlay network is a logical
representation of a physical network including the multicast tree.

27. The node of claim 26, wherein the global information table includes information for
nodes physically close in the physical network.

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28. The node of claim 24, further comprising:

means for searching the stored information to identify a plurality of service nodes
operable to provide the requested service in response to one of a service path not existing that
is operable to provide the requested service and a service path not existing that is operable to
20 provide the requested service and provide at least one predetermined QoS characteristic.

29. The node of claim 28, further comprising:

means for applying a clustering algorithm to the plurality of service nodes to identify a set of candidate service nodes from the plurality of service nodes closest to a node requesting the service.

5 30. A computer system comprises:

a processor operable to determine a physical location of the computer system in a peer-to-peer network by determining distances to at least one global landmark node and at least one local landmark node proximally located to the computer system in the peer-to-peer network; and

10 a memory operable to store location information and information identifying service provided for a plurality of nodes in the peer-to-peer network.

15 31. The computer system of claim 30, wherein the stored information comprises location information and information identifying service provided for a plurality of nodes physically close in the peer-to-peer network.

32. The computer system of claim 31, wherein the processor is operable to hash the location information to identify a node in the overlay network to transmit the location information.

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33. The computer system of claim 32, further comprising a network interface operable to transmit the location information to the identified node in the overlay network.

34. The computer system of claim 31, wherein the processor is operable to search the memory to identify a service path or a service node operable to provide a requested service in a multicast network using the peer-to-peer network.

5 35. Computer software embedded on a computer readable medium, the computer software comprising instructions performing:

receiving a request at anode for at least one service, and
searching stored information at the node for at least one of a service path and a service node operable to provide the requested service.

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36. The computer software of claim 35, further comprising instructions performing:
searching the stored information to identify a plurality of service nodes operable to provide the requested service in response to one of a service path not existing that is operable to provide the requested service and a service path not existing that is operable to provide the
15 requested service and provide at least one predetermined QoS characteristic.

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37. The computer software of claim 36, further comprising instructions performing:
applying a clustering algorithm to the plurality of service nodes to identify a set of candidate service nodes from the plurality of service nodes closest to a node requesting the
20 service.